

AMENDMENT

Amendments to the Claims: Please replace all prior versions and listings of claims with the following listing of claims.

LISTING OF CLAIMS:

1-3. (Cancelled)

4. (Currently Amended) A method ~~of monitoring a state of a~~ for component to service supported by a network, wherein the network includes a plurality of network components, wherein the service supports a business process under service level management mapping in association with a service level management domain, the method comprising the steps of:

providing a service over a network having a plurality of network components that support the service, wherein performance of the service depends upon performances of the plurality of network components that support the service, and wherein the service has a state that represents the performance of the service;

monitoring a plurality of component parameters for the plurality of selecting one or more network components that support on which the service using a plurality of monitoring agents, wherein each of the plurality of monitoring agents are configured to monitor a subset of depends from among the plurality of network components in a respective domain of a plurality of domains of the network;

mapping the plurality of component parameters monitored across the plurality of domains to a service parameter that represents the state of one or more selected network components to the service, wherein the state of the service indicates whether the service conforms to an agreed upon service level identified in a service level agreement;

monitoring the one or more selected network components to determine the state of the service;

monitoring the service parameter that represents the state of the service to detect a change in the state of the service; and

~~when the state of the service changes, determining a cause of the change in the state of the service by performing an action in response to detecting the change in the state of the service, wherein determining the action comprising one or more cause of the change in the state of the service includes:~~

~~invoking a routine to determine an operational characteristic of at least one of the selected network components;~~

~~determining constructing a first value for a first subset database query to determine the operational characteristic of at least one of the monitored component parameters in a first domain of the plurality of domains of the selected network components, and a second value for a second subset of the monitored component parameters in a second domain of the plurality of domains of the network; and~~

~~executing requesting a change to one or more data mining algorithms that discover a first influence that the first subset of component parameters have on of at least one of the selected network components service parameter from the first value and a second influence that the second subset of component parameters have on the service parameter from the second value.~~

5-12. (Cancelled)

13. (Currently Amended) A method for component to monitoring a service, the service supporting a business process under mapping in service level management in association with a service level agreement, wherein the service is monitored by an enterprise management system, wherein the business process depends on at least a portion of a network, the method comprising the steps of:

providing a service over a network having a plurality of network components that support the service, wherein performance of the service depends upon performances of the plurality of network components that support the service, and wherein the service has a state that represents the performance of the service;

monitoring a plurality of component parameters for the plurality of network components that support the service across a plurality of domains of the network;

mapping the plurality of at least one component parameters monitored across the plurality of domains of the network on which the to a service depends to parameter that represents the state of the service, wherein the state of the service indicates whether the service conforms to an agreed upon service level identified in a service level agreement;

monitoring, at the enterprise management system, at least one parameter of the mapped network component, the at least one parameter indicating an operational characteristic of the network component that is indicative of a state of the service, wherein the state of the service is indicative of a current level of service relative to an agreed upon level of service in the service level agreement;

monitoring determining, at the enterprise management system, service parameter that represents the state of the service to detect a change in from the parameter state of the monitored network component service; and

determining a cause of monitoring, at the enterprise management system, change in the state of the service in response to detecting provide service level management for the change in business process that indicates the current level state of the service, wherein determining relative to the cause of the change in the state agreed upon level of the service includes:

executing one or more data mining algorithms to discover respective influences on the service parameter for a first subset of the monitored component parameters in a first domain of the plurality of domains of the network;

executing the one or more data mining algorithms to discover respective influences on the service parameter for a second subset of the monitored component parameters in a second domain of the plurality of domains of the network; and

identifying at least one of the component parameters in the first subset of the monitored component parameters or the second subset of the monitored component parameters as the cause of the change in the state of the service.

14. (Currently Amended) The method of claim 13, wherein the ~~method further comprises a step of, associating a parameter of the service with a parameter of the associated network component, the service parameter comprising~~ has a variable having a value that indicates whether the state which represents an operational characteristic of the service provided by conforms to the agreed upon service level identified in the network service level agreement.

15. (Currently Amended) The method of claim 14, wherein determining the method cause of the change in the state of the service further comprises includes organizing the plurality of component parameters monitored across the plurality of domains of the network into a step of, determining a value for the service time ordered set of parameter vectors that reflect from the state value of the associated network component parameter service over an interval that includes a plurality of time increments.

16. (Currently Amended) The method of claim [[13]] 15, wherein monitoring the method further comprises a step of, invoking a mathematical simulation of the service parameter to determine detect the change in the state of the service includes:

determining that the time ordered set of parameter vectors reflects that the state of the service conformed to the agreed upon service level at a first one of the plurality of time increments in the interval; and

detecting the change in the state of the service in response to the time ordered set of parameter vectors further reflecting that the state of the service did not conform to the agreed upon service level at a second one of the plurality of time increments in the interval.

17. (Currently Amended) The method of claim [[13]] 15, wherein monitoring the method further comprises a step of, invoking a reasoning mechanism service parameter to determine detect the change in the state of the network component service includes:

determining that the time ordered set of parameter vectors reflects that the state of the service did not conform to the agreed upon service level at a first one of the plurality of time increments in the interval; and

detecting the change in the state of the service in response to the time ordered set of parameter vectors further reflecting that the state of the service conformed to the agreed upon service level at a second one of the plurality of time increments in the interval.

18. (Currently Amended) The method of claim 13, ~~wherein the method further comprising~~ comprises a step of, associating an agent with the monitored network component to generate ~~generating an alarm in response to detecting when a value of a parameter of the monitored network component crosses a threshold~~ change in the state of the service.

19. (Currently Amended) The method of claim 13, wherein the one or more data mining algorithms include ~~method further comprises a step of, selecting a rule induction algorithm that comprises producing from a repository plurality of rules that represent associated with the~~ respective influences that the first subset state of the monitored component parameters have on the service, wherein parameter and the respective influences that the second subset of rule indicates an action based on the monitored component parameters have on state of the service parameter.

20. (Currently Amended) The method of claim 19, wherein the one or more rules include ~~one or more method further comprises a step of, invoking propositional statements or quantified statements that represent the respective influences that the first subset of the monitored component parameters and the second subset of the monitored component parameters have on action to implement the selected rule service parameter.~~

21. (Currently Amended) The method of claim 19, wherein the one or more data mining algorithms further include a neural network algorithm that action ~~comprises:~~

identifying a step case library that includes a plurality of cases representing episodes of,
modifying a data structure having a representation problem solving;

applying the plurality of rules to identify one or more of the cases in the case library
that are relevant to discovering operational characteristic of the respective influences for the

first subset of the monitored component parameters and the second subset of the monitored component parameters; and

adapting one or more solution variable associated with the identified cases using parameterized adaptation logic to discover the respective influences that the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter.

22. (Currently Amended) The method of claim [[19]] 13, wherein the one or more data mining algorithms include a decision tree algorithm that action comprises:

producing a decision tree that represents the respective influences that the first subset step of, invoking a database query to determine the operational characteristic monitored component parameters and the second subset of the network monitored component parameters have on the service parameter; and

representing the respective influences that the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter using one or more of numeric values or binary values.

23. (Currently Amended) The method of claim [[19]] 13, wherein the one or more data mining algorithms include a top N algorithm that action comprises:

identifying a predetermined number step of, invoking a second reasoning mechanism to determine the component parameters in the first subset operational characteristic of the network monitored component parameters and the second subset of the monitored component parameters that have a greatest influence on the service parameter; and

producing a list that includes the identified component parameters having the greatest influence on the service parameter, wherein the identified component parameters are listed in a decreasing order of the respective influences that the identified component parameters have on the service parameter.

24. (Currently Amended) The method of claim [[19]] 13, wherein the one or more data mining algorithms include an inductive logic algorithm that action comprises:

incorporating knowledge relating a step of, invoking a routine to determine the plurality of domains operational characteristic of the network and knowledge relating to the first subset of the monitored component parameters and the second subset of the monitored component parameters within a rule base;

inferring the respective influences that each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter using the knowledge incorporated within the rule base; and

producing one or more of propositional statements or quantified statements that express the respective influences that the each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter.

25. (Currently Amended) The method of claim [[20]] 13, wherein the one or more data mining algorithms include a fuzzy logic algorithm that reasoning mechanism comprises:

translating a step of, selecting rules from the first subset of the monitored component parameters rule repository and invoking actions to implement the second subset of selected rules until the monitored component parameters into service achieves a desired plurality of respective fuzzy concepts;

determining grades of membership that the first subset of the monitored component parameters and the second subset of the monitored component parameters have in the respective fuzzy concepts, wherein the grades of membership quantify transitions between a plurality of states in a state transition graph; and

inferring the respective influences that each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter from the grades of membership that each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have in the respective fuzzy concepts.

26. (Cancelled)

27. (Currently Amended) A system for component to monitoring a service, the service supporting a business process under mapping in service level management in association with a service level agreement, wherein the service is monitored by an enterprise management system, wherein the business process is performable in connection with at least a portion of a network, the system comprising:

a network having a plurality of network components that support a service provided over the network, wherein performance of the service depends upon performances of the plurality of network components that support the service, and wherein the service has a state that represents the performance of the service;

a mapping mechanism for mapping a component of the network on which the service depends to the service;

a plurality of monitoring agents that monitor a plurality of component parameters mechanism for monitoring at least one parameter of the mapped network plurality of component parameters that support at the enterprise management system, the at least one parameter indicating an operational characteristic of the network component that is indicative of a state of the service, wherein the state of the service across is indicative of a plurality current level of domains service relative to an agreed upon level of service in the service level agreement network; and

a network management system configured to:

map the plurality of component parameters monitored across the plurality of domains of the network a service parameter that represents the state of the service, wherein the state of the service indicates whether the service conforms to an agreed upon service level identified in a service level agreement;

monitor a reasoning mechanism for determining, at the service parameter that represents management system, the state of the service from to detect a change in the parameter state of the monitored network component service; and

~~execute one or more data mining algorithms to discover respective influences on a service monitoring mechanism for monitoring at the service parameter for a first subset management system, the state of the monitored component parameters in a first domain of service supporting the plurality of domains business process to provide service level management of the network in response to detecting business process that indicates the change in the state current level of service relative to the agreed upon level of the service;~~

~~execute the one or more data mining algorithms to discover respective influences on the service parameter for a second subset of the monitored component parameters in a second domain of the plurality of domains of the network in response to detecting the change in the state of the service; and~~

~~identify at least one of the component parameters in the first subset of the monitored component parameters or the second subset of the monitored component parameters as the cause of the change in the state of the service.~~

28. (Currently Amended) The system of claim 27, wherein the ~~mapping mechanism associates a parameter of the service with the parameter of the associated network component, the service parameter comprising~~ has a variable having a value that indicates whether the state which represents an operational characteristic of the service provided by conforms to the agreed upon service level identified in the network service level agreement.

29. (Currently Amended) The system of claim 28, wherein ~~a value for the network management system is further configured to organize the plurality of component parameters monitored across the plurality of domains of the network into a time ordered set of service parameter vectors that reflect the state is determined from a value of the associated network component service over an interval that includes a plurality of time increments.~~

30. (Currently Amended) The system of claim [[27]] 29, wherein the network management reasoning mechanism comprises a rule-based reasoning system is further configured to:

determine that for determining the condition time ordered set of parameter vectors reflects that the state of the service conformed to the agreed upon service level at a first one of the plurality of time increments in the interval; and

detect the change in the state of the service in response to the time ordered set of parameter vectors further reflecting that the state of the service did not conform to the agreed upon service level at a second one of the plurality of time increments in the interval.

31. (Currently Amended) The system of claim [[27]] 29, wherein the network management reasoning mechanism comprises a model-based reasoning system is further configured to:

determine that for determining the condition time ordered set of parameter vectors reflects that the state of the service did not conform to the agreed upon service level at a first one of the plurality of time increments in the interval; and

detect the change in the state of the service in response to the time ordered set of parameter vectors further reflecting that the state of the service conformed to the agreed upon service level at a second one of the plurality of time increments in the interval.

32. (Currently Amended) The system of claim 27, wherein the one or more data mining algorithms include a rule induction algorithm that reasoning mechanism comprises producing a plurality of rules that represent case-based reasoning system for determining the condition of respective influences that the first subset of the monitored component parameters have on the service parameter and the respective influences that the second subset of the monitored component parameters have on the service parameter.

33. (Currently Amended) The system of claim [[27]] 32, wherein the one or more rules include one or more of propositional statements or quantified statements that represent reasoning mechanism comprises a state transition graph reasoning system for determining the condition of respective influences that the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter.

34. (Currently Amended) The system of claim [[27]] 32, wherein the one or more data mining algorithms further include a neural network algorithm that ~~reasoning mechanism~~ comprises:

identifying a ~~codebook reasoning system for determining case library that includes a~~ plurality of cases representing episodes of problem solving;

applying the ~~condition~~ plurality of rules to identify one or more of the cases in the case library that are relevant to discovering the respective influences for the first subset of the monitored component parameters and the second subset of the monitored component parameters; and

adapting one or more solution variable associated with the identified cases using parameterized adaptation logic to discover the respective influences that the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter.

35. (Currently Amended) The system of claim 27, wherein the one or more data mining algorithms include a decision tree algorithm that comprises:

producing a decision tree that represents ~~reasoning mechanism determines the condition~~ respective influences that the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter; and

representing the respective influences that the first subset ~~from a mathematical simulation of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter using one or more of numeric values or binary values.~~

36. (Currently Amended) The system of claim [[28]] 27, wherein the network management system is further ~~comprises, an agent associated with the monitored network component~~

configured to generate an alarm in response to detecting when the value of the parameter of the monitored network component crosses a threshold change in the state of the service.

37. **(Currently Amended)** The system of claim 27, wherein the one or more data mining algorithms include a top N algorithm that reasoning mechanism comprises:

identifying a data structure holding a representation predetermined number of the component parameters in the first subset an operational characteristic of the monitored component parameters and the second subset of the monitored component parameters that have a greatest influence on the service parameter; and

a rule repository having a rule indicating an operation based on the state of the service;
and

producing a list that includes an inference mechanism selecting the rule from identified component parameters having the rule repository applicable to greatest influence on the service parameter, wherein the identified component parameters are listed in a decreasing order state of the respective influences that the identified component parameters have on the service parameter.

38. **(Currently Amended)** The system of claim [[37]] 27, wherein the one or more data mining algorithms include an inductive logic algorithm that comprises:

incorporating knowledge relating to inference mechanism invokes the operation plurality of domains of the network and knowledge relating to implement the selected first subset of the monitored component parameters and the second subset of the monitored component parameters within a rule base;

inferring the respective influences that each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter using the knowledge incorporated within the rule base; and

producing one or more of propositional statements or quantified statements that express the respective influences that the each of the first subset of the monitored component

parameters and the second subset of the monitored component parameters have on the service parameter.

39. (Currently Amended) The system of claim [[37]] 27, wherein the one or more data mining algorithms include a fuzzy logic algorithm that comprises:

translating operation modifies the representation first subset of the monitored component parameters and the second subset of the monitored component parameters into a plurality of respective fuzzy concepts;

determining grades of membership that the first subset of the monitored component parameters and the second subset of the monitored component parameters have service in the data structure respective fuzzy concepts, wherein the grades of membership quantify transitions between a plurality of states in a state transition graph; and

inferring the respective influences that each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter from the grades of membership that each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have in the respective fuzzy concepts.

40-48. (Cancelled)

49. (Currently Amended) ~~A computer program product comprising a computer-readable medium containing having computer-executable instructions logic recorded thereon for providing enabling a processor in a computer system to monitor a service, the service analysis supporting a business process under in service level management in association with a service level agreement, wherein executing the computer-executable instructions the service is monitored by an enterprise management system, wherein the business process depends on at least a portion of on a network, the computer program adapted to cause causes the computer system to perform the steps of:~~

provide a service over a network having a plurality of network components that support the service, wherein performance of the service depends upon performances of the plurality of network components that support the service, and wherein the service has a state that represents the performance of the service;

monitor a plurality of component parameters for the plurality of network components that support the service across a plurality of domains of the network;

map the plurality of mapping at least one component parameters monitored across the plurality of domains of the network on which the to a service depends to parameter that represents the state of the service, wherein the state of the service indicates whether the service conforms to an agreed upon service level identified in a service level agreement;

monitor monitoring, at the enterprise management system, at least one service parameter that represents of the mapped network component, the at least one parameter indicating an operational characteristic of the network component that is indicative of a state of the service, wherein the state of the service is indicative of to detect a current level of service relative to an agreed upon level of service change in the state of the service level agreement;

execute one or more data mining algorithms to discover respective influences on determining, at the service parameter for a first subset management system, the state of the monitored component parameters in a first domain service from the parameter of the monitored network component network in response to detecting the change in the state of the service; and

execute monitoring, at the service management system, one or more data mining algorithms to discover respective influences on the state of the service parameters to provide service level management for a second subset of the monitored component parameters in a second domain of business process that indicates the plurality current level of domains of the network in response service relative to detecting the agreed upon level change in the state of the service; and

identify at least one of the component parameters in the first subset of the monitored component parameters or the second subset of the monitored component parameters as the cause of the change in the state of the service.

50. (Currently Amended) The computer-readable medium ~~program-product~~ of claim 49, wherein the ~~computer system further performs a step of, associating a parameter of the service with a parameter of the associated network component, the service parameter comprising~~ has a variable having a value that indicates whether the state which represents an operational characteristic of the service provided by conforms to the agreed upon service level identified in the network service level agreement.

51. (Currently Amended) The computer-readable medium ~~program-product~~ of claim [[49]] 50, wherein executing the computer-executable instructions on the computer system further cause performs a step of, determining a value for the computer to organize the plurality of component parameters monitored across the plurality of domains of the network into a time ordered set of service parameter vectors that reflect the state from the value of the associated network component parameter service over an interval that includes a plurality of time increments.

52. (Currently Amended) The computer-readable medium ~~program~~ of claim [[49]] 51, wherein executing the computer-executable instructions on the computer system further cause performs a step of, invoking a mathematical simulation of the service computer to:

determine that the time ordered set of parameter vectors reflects that the state of the service conformed to the agreed upon service level at a first one of the plurality of time increments in the interval; and

detect the change in the state of the service in response to the time ordered set of parameter vectors further reflecting that the state of the service did not conform to the agreed upon service level at a second one of the plurality of time increments in the interval.

53. (Currently Amended) The computer-readable medium ~~program~~ of claim [[49]] 51, wherein executing the computer-executable instructions on the computer system further cause performs a step of, invoking a reasoning mechanism the computer to:

determine that the time ordered set of parameter vectors reflects that the state of the service did not conform to the agreed upon service level at a first one of the plurality of time increments in the interval; and

detect the change in the state of the service in response to the time ordered set of parameter vectors further reflecting that the state of the service conformed to the agreed upon service level at a second one of the plurality of time increments in the interval.

54. (Currently Amended) The computer-readable medium ~~program~~ of claim 49, wherein the one or more data mining algorithms include computer system further performs a rule induction algorithm that comprises producing a plurality step of, associating an agent with rules that represent the respective influences that the first subset of the monitored network component parameters have on the service parameter and the respective influences that the second subset to generate an alarm when a value of the monitored component parameters have on the service [[a]] ~~parameter of the monitored network component crosses a threshold.~~

55. (Currently Amended) The computer-readable medium ~~program~~ of claim [[49]] 54, wherein the one or more rules include one or more computer system further performs a step of, selecting a rule from a repository of rules associated with propositional statements or quantified statements that represent respective influences that the first subset state of the monitored component parameters and service, wherein the second subset of rule indicates an action based on the state of monitored component parameters have on the service parameter.

56. (Currently Amended) The computer-readable medium ~~program~~ of claim [[55]] 54, wherein the one or more data mining algorithms further include computer system further performs a step of, neural network algorithm that comprises:

identifying a case library that includes a plurality of cases representing episodes of problem solving;

applying ~~invoking~~ the plurality of rules ~~action~~ to ~~implement~~ selected rule identify one or more of the cases in the case library that are relevant to discovering the respective influences for the first subset of the monitored component parameters and the second subset of the monitored component parameters; and

adapting one or more solution variable associated with the identified cases using parameterized adaptation logic to discover the respective influences that the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter.

57. (Currently Amended) The computer-readable medium ~~program~~ of claim [[55]] 49, wherein the one or more data mining algorithms include ~~computer system further performs a step of, decision tree algorithm that comprises:~~

producing ~~modifying~~ a decision tree that represents the respective influences that the first subset data structure having a representation of the monitored component parameters and the second subset operational characteristic of the monitored component parameters have on the service parameter; and

representing the respective influences that the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter using one or more of numeric values or binary values.

58. (Currently Amended) The computer-readable medium ~~program~~ of claim 49, wherein the executing the computer-executable instructions on the computer system further cause performs a step of, invoking a database query the computer to generate an alarm in response to detecting determine the operational characteristic change in the state of the network component service.

59. (Currently Amended) The computer-readable medium ~~program~~ of claim [[53]] 49, wherein the one or more data mining algorithms include ~~computer system further performs a step of, invoking~~ top N algorithm that comprises:

identifying a predetermined number of the component parameters in the first subset of the monitored component parameters and the second subset reasoning mechanism to determine the operational characteristic of the network monitored component parameters that have a greatest influence on the service parameter; and

producing a list that includes the identified component parameters having the greatest influence on the service parameter, wherein the identified component parameters are listed in a decreasing order of the respective influences that the identified component parameters have on the service parameter.

60. (Currently Amended) The computer-readable medium ~~program~~ of claim 49, wherein the one or more data mining algorithms include an inductive logic algorithm that comprises:

incorporating knowledge relating to the plurality ~~computer system further performs a step of, invoking a routine~~ domains of the network and knowledge relating to determine the first subset operational characteristic of the network monitored component parameters and the second subset of the monitored component parameters within a rule base;

inferring the respective influences that each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter using the knowledge incorporated within the rule base; and

producing one or more of propositional statements or quantified statements that express the respective influences that the each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service parameter.

61. (Currently Amended) The computer-readable medium ~~program~~ of claim 49, wherein the mining algorithms include ~~computer system further performs a step of, selecting rules from~~ fuzzy logic algorithm that comprises:

translating the rule repository first subset of the monitored component parameters and invoking actions to implement the second subset of the monitored component parameters into a plurality of respective fuzzy concepts;

determining grades of membership that selected rules until the first subset of the monitored component parameters and the second subset of the monitored component parameters have in the respective fuzzy concepts, wherein the grades of membership quantify transitions between a plurality of states in a state transition graph; and

inferring the respective influences that each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have on the service achieves a desired state parameter from the grades of membership that each of the first subset of the monitored component parameters and the second subset of the monitored component parameters have in the respective fuzzy concepts.

62. (Cancelled)